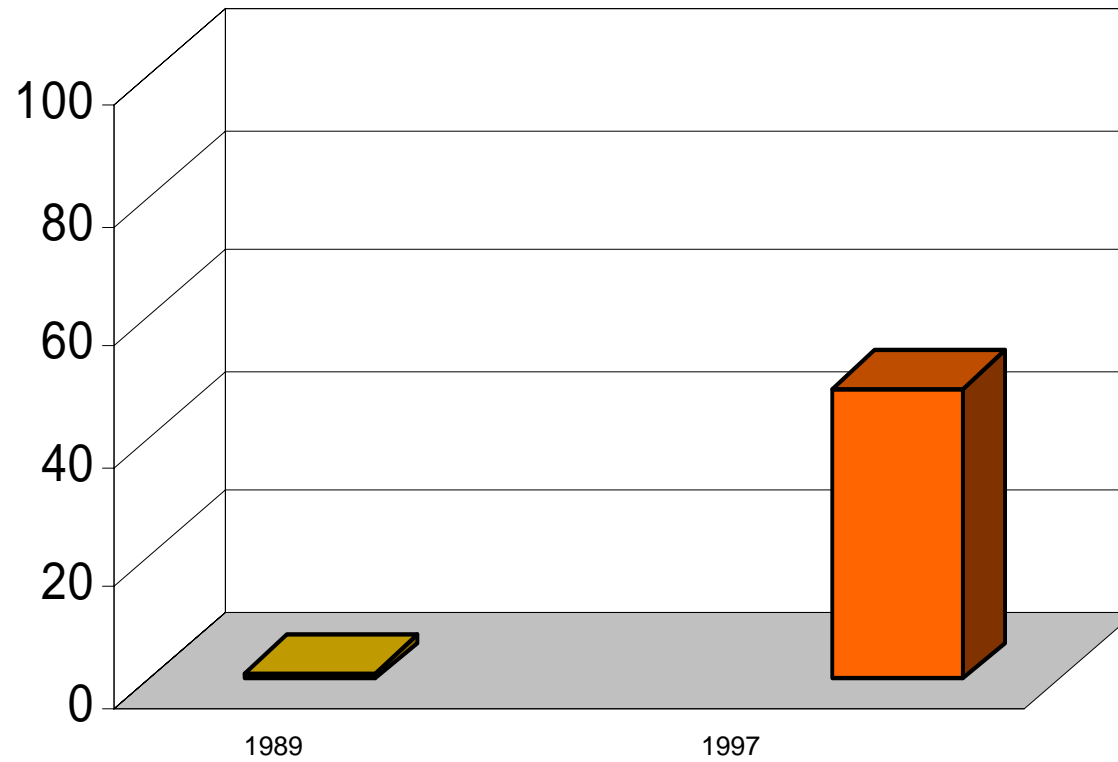


Control of dense- flowered cordgrass (*Spartina densiflora*) in Humboldt Bay

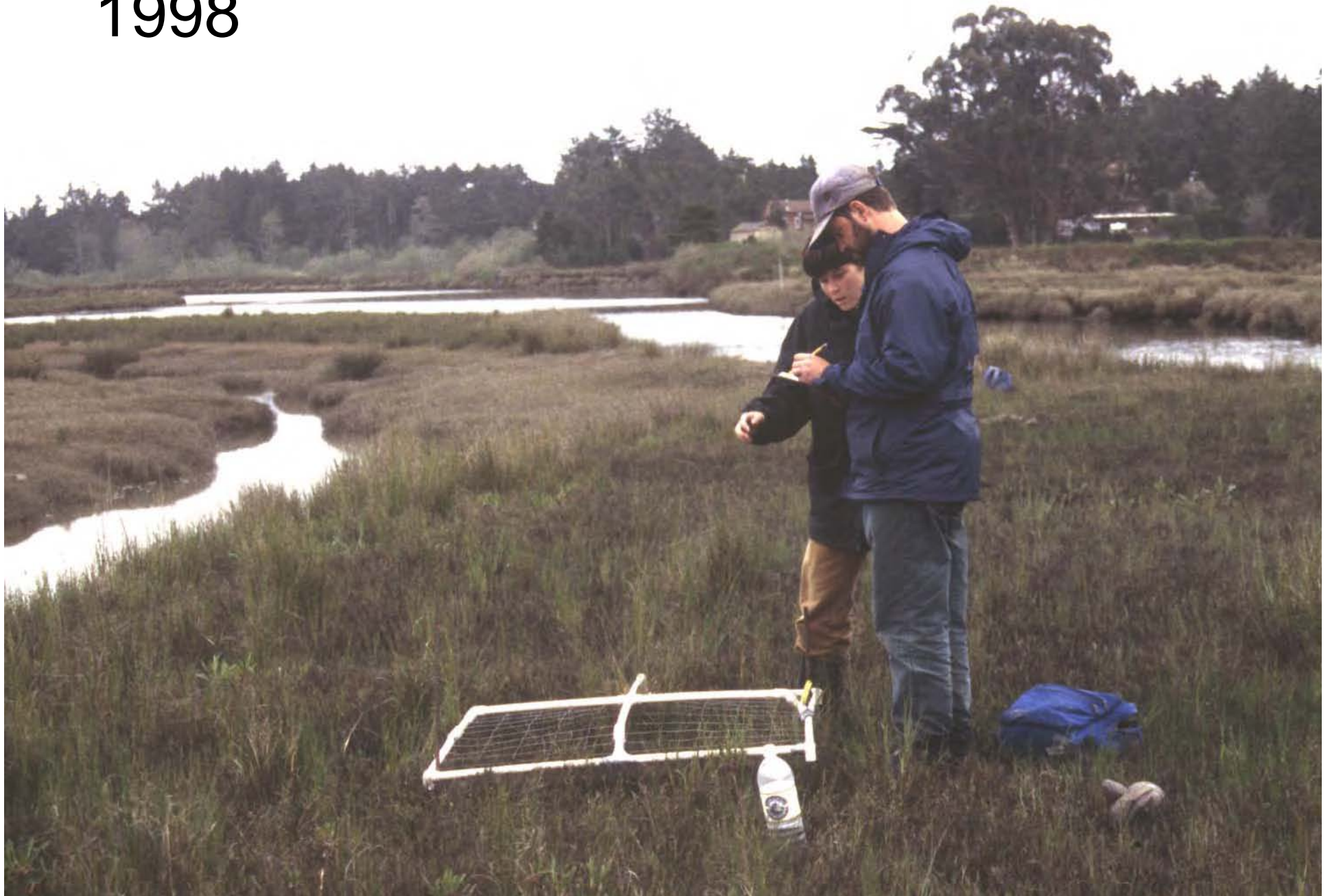


Andrea Pickart, Humboldt Bay National Wildlife Refuge

Frequency of
Spartina densiflora
at Mad River Slough

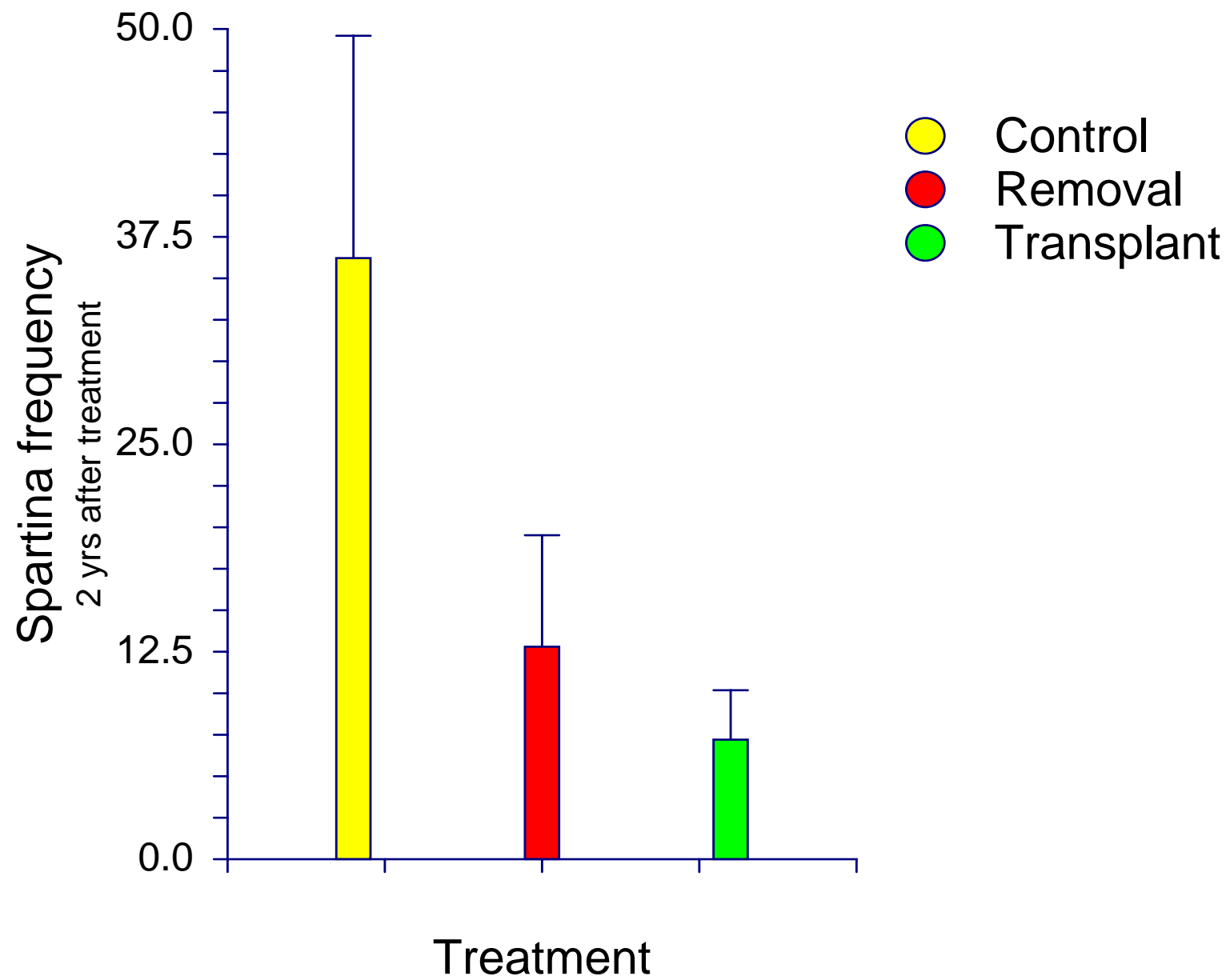


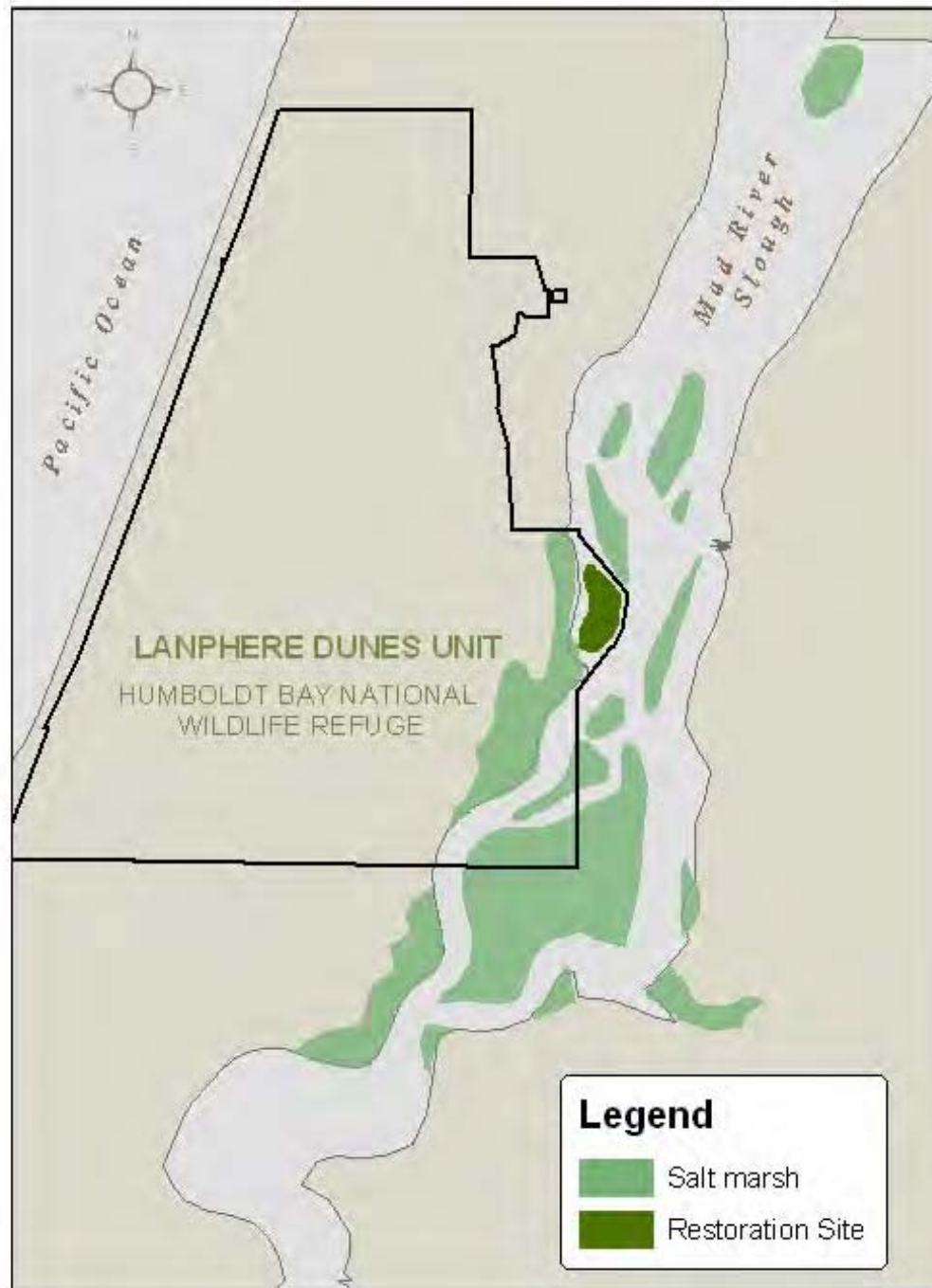
1998











2004





Invasive Spartina Control Experiment







Treatments:

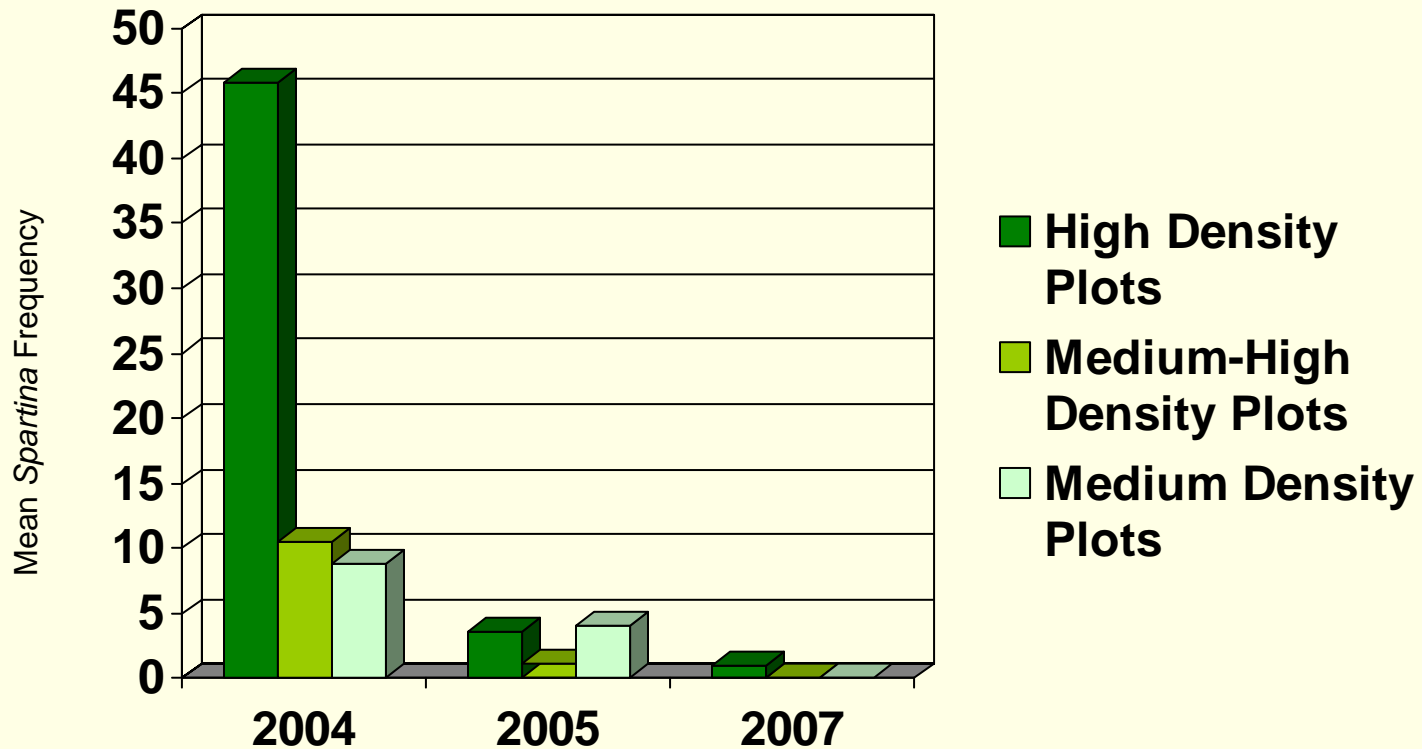
High Density Plots: Mowed August 2004 to ground level, quarterly retreatment (Oct - Dec) during winter; monthly during Spring-Summer 2005, Remaining plants dug Dec. 2005. Maximum total treatments = 12

Medium High Density Plots: Spot-mowed August 2004 to ground level, scattered plants to height of surrounding vegetation. Quarterly (winter) then monthly (spring-summer 2005) retreatment to height of surrounding vegetation. Maximum total treatments = 12.

Medium Density Plots: Spot Mowed to ground level October 2004. Quarterly (winter) then monthly (spring-summer) mowing to height of surrounding vegetation. Remaining plants dug Dec. 2005. Maximum total treatments = 12.

Medium-Low Density and Low-Density Plots: Dug

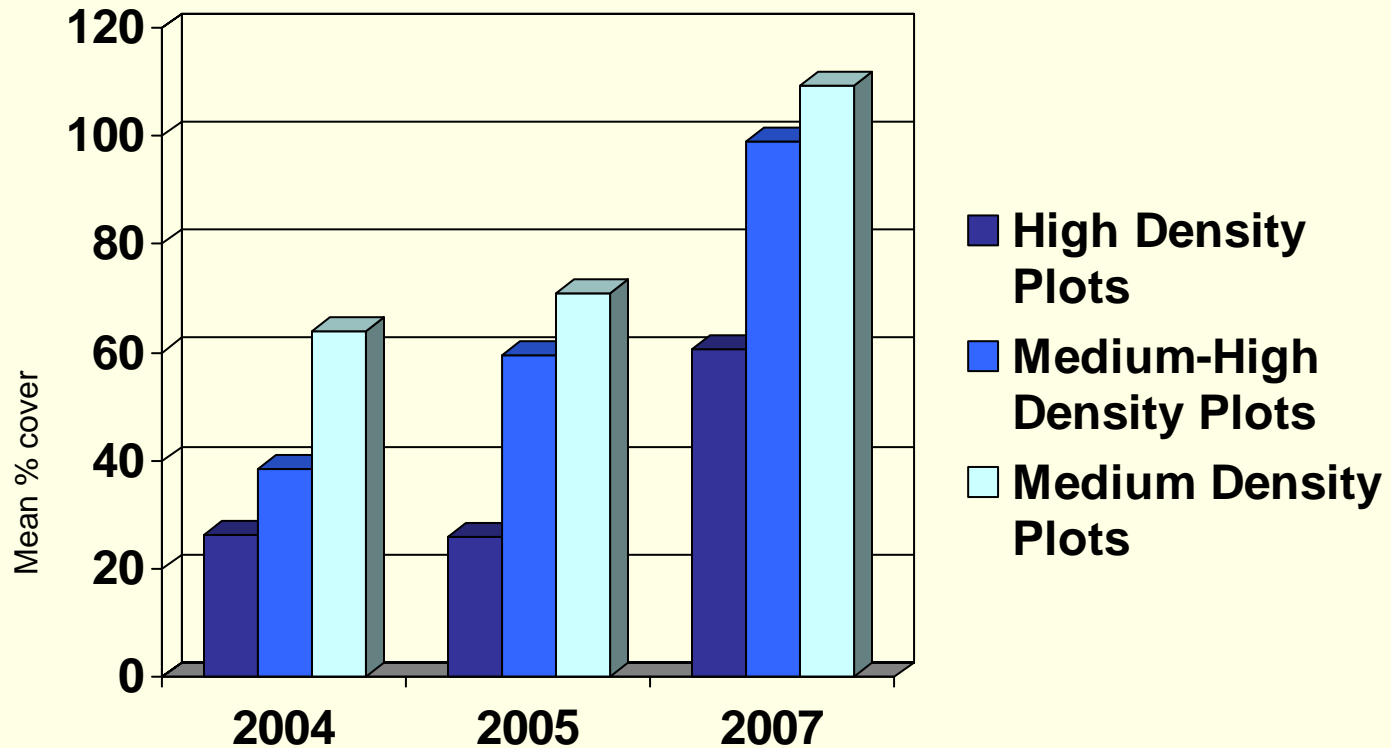
Changes in frequency of *Spartina* in mowed plots



NO RE-INVASION

NO SEEDLING RECRUITMENT!!

Changes in % cover of native species in mowed plots

















High Density Plot Before
July 2004



April 2005



High Density Plot Before
July 2004



September 2005



High Density Plot Before
July 2004



October 2007



Medium Density Plot Before
July 2004



Jan. 2005



Medium Density Plot Before
July 2004



March 2005





Medium Density Plot Before
July 2004



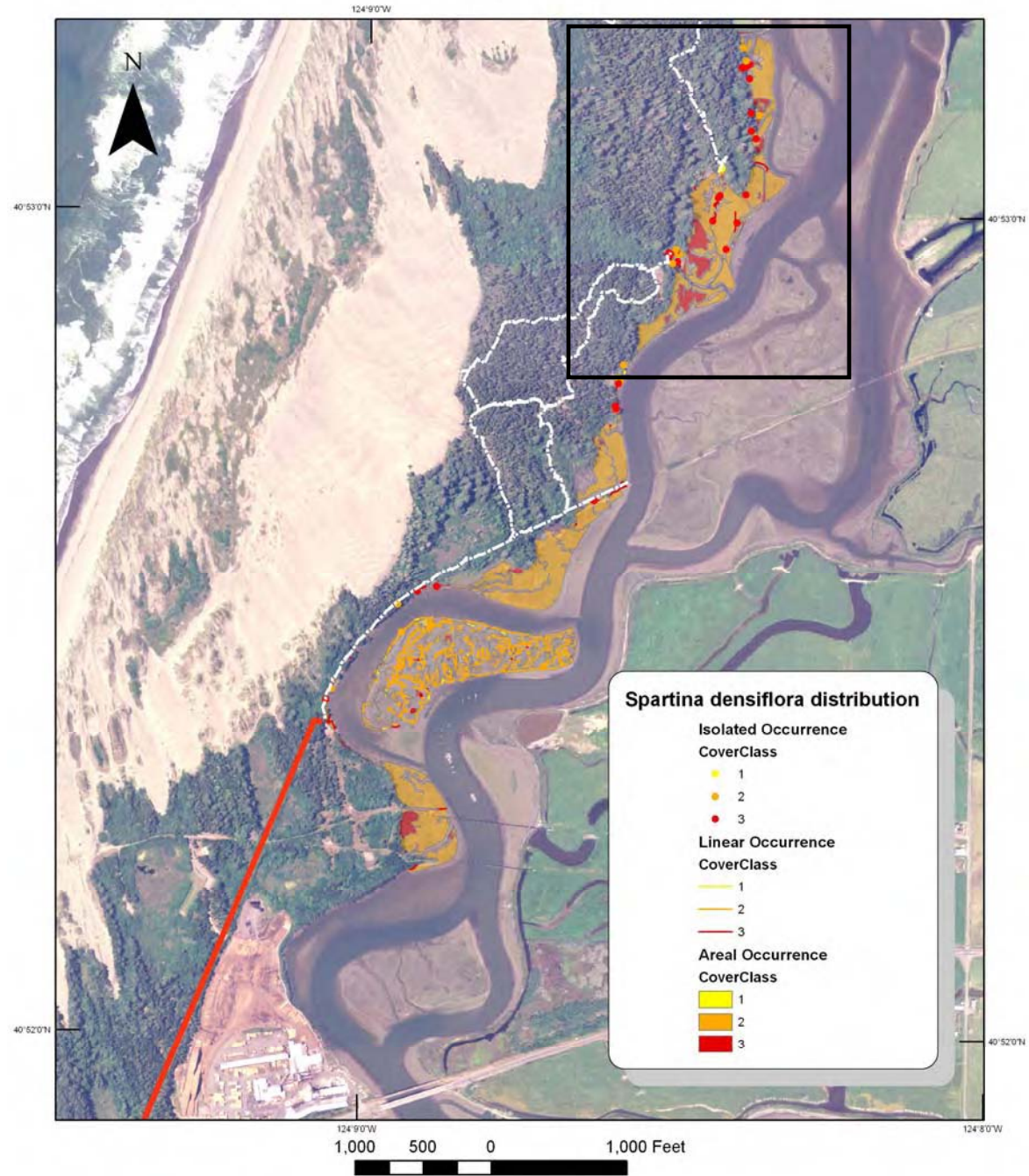
October 2007







Spartina Control Map





of treatments reduced from 12 over 2 years to 3-6 over 1 year











SURPRISE NO. 1



A photograph of a wetland or marsh area. The ground is dark, muddy, and saturated with water. Numerous clumps of green, blade-like grasses are growing out of the mud. Interspersed among the green grasses are some dried, brown stalks and stems. The overall scene suggests a natural, undisturbed wetland environment. The text "SURPRISE NO. 2" is overlaid in white, bold, sans-serif font in the upper left quadrant of the image.

SURPRISE NO. 2





CORRELATIONS APRIL 2007

	Bare mud	Algal mats	Wrack	Salt grass	Jaumea	Pickle-weed
<i>Spartina</i> seedlings	+.2	+.7	-.1	-.6	-.2	-.2
<i>Spartina</i> resprouts	+.2	+.3	-.1	-.2	0	0
Salt grass	-.2	-.6	-.3		0	0
Jaumea	0	-.2	0	0		0
Pickleweed	0	-.3	-.2	0	0	

	Bare mud	Algal mats
<i>Spartina</i> seedlings	+.2	+.7
<i>Spartina</i> resprouts	+.2	+.3

Spartina seedlings AND resprouts were positively correlated with bare mud, seedlings enhanced by algal mats, no relationship with wrack.

	Salt grass	Jaumea	Pickle- weed
<i>Spartina</i> seedlings	-.6	-.2	-.2
<i>Spartina</i> resprouts	-.2	0	0

Spartina seedlings (and to lesser extent resprouts) were negatively correlated with native plants, especially salt grass.

	Bare mud	Algal mats	Wrack
Salt grass	-.2	-.6	-.3
Jaumea	0	-.2	0
Pickleweed	0	-.3	-.2

Native plants (especially salt grass) were negatively correlated with bare mud, algal mats, and wrack.



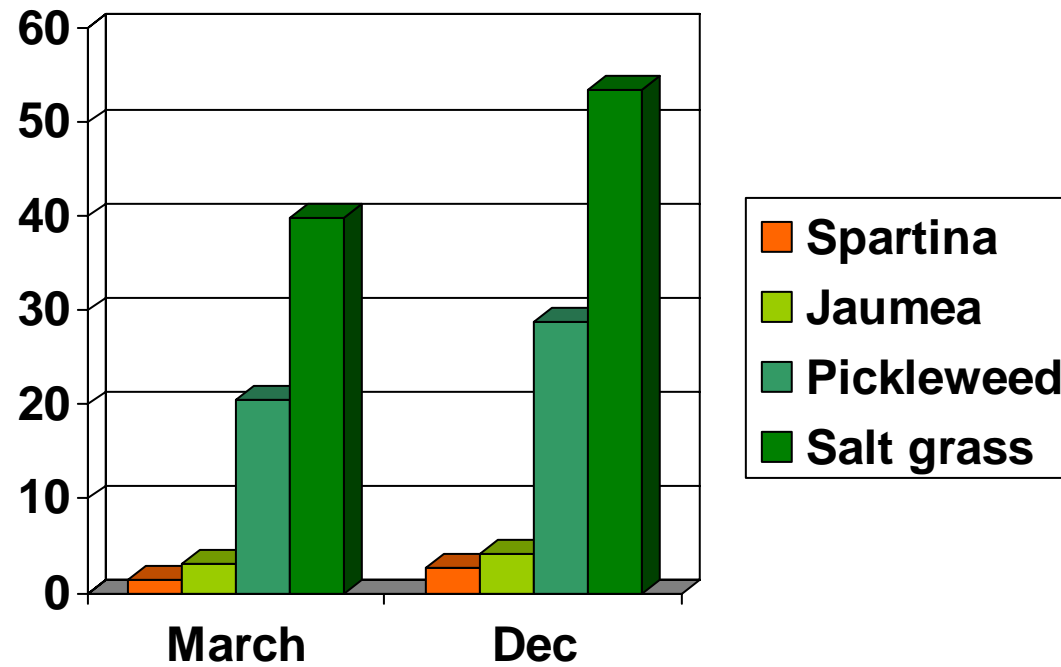








Change in cover of *Spartina* and Native Species
between March 2007 and December 2007



Photopoint 1

AUGUST 2006 BEFORE



Photopoint 1

APRIL 2007



Photopoint 1

NOVEMBER 2007



Photopoint 5



AUGUST 2006 BEFORE

Photopoint 5

APRIL 2007



Photopoint 5

NOVEMBER 2007



Photopoint 9

AUGUST 2006 BEFORE



Photopoint 9



APRIL 2007

Photopoint 9

NOVEMBER 2007





JULY 2006



Photopoint 21

AUGUST 2006 BEFORE



Photopoint 21

NOVEMBER 2007



Photopoint 22

AUGUST 2006 BEFORE



Photopoint 22

NOVEMBER 2007





















•Need to develop efficient propagation methods

•Need to develop most efficient planting methods



SUMMARY

- We can eradicate *Spartina* in absence of new seed input
- Regional approach needed
- Are there more efficient, less impacting methods?
- We need to quantify impacts of this and other possible treatments (erosion of marsh plain and tidal creek banks, turbidity, inverts, etc.)
- Are algal mats as transitional stage detrimental, beneficial, or neutral with respect to salt marsh restoration vs. estuarine productivity?



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Zito, California Department of Forestry and Fire Protection, California Coastal Conservancy